

REMARKS

Claims 1-5 and 7-26 have been amended. Applicant has canceled Claims 6 and 27-33. Applicant has added new Claims 34. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the above amendments and the following remarks.

Discussion of Amendments

Support for the amendment to claim 1 may be found in original claim 6. Since claim 1 as amended recites a method rather than a transmission system, claims 2-5 and 7-25 have been amended to refer to a method rather than a transmission system. Claim 26 as amended depends from claim 1.

Claim 34 has been added to describe the sets of engagement members in further detail. The support for the amendment can be found, for example, in paragraph [0043] lines 4-11.

Rejection under 35 U.S.C. §102(b)

Claims 1-5, 7-19, 21-23 and 26 were rejected under 35 U.S.C. §102(b) as being anticipated by US 3,872,737 to Thomas (Thomas '737). Applicants respectfully disagree with the Examiner and submit that Thomas '737 does not anticipate Claims 1-5, 7-19, 21-23 and 26 as discussed below.

The Law of Anticipation

Anticipation under Section 102 can be found only if a reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775 (Fed. Cir. 1985). More particularly, a finding of anticipation requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention. *Electro Med. Sys. S.A. v. Cooper Life Sciences*, 34 F.3d 1048, 1052 (Fed. Cir. 1994).

Disclosure of Thomas '737

In Thomas '737 when performing downshifts, for example from 2nd gear 27 (on left) to 1st gear 29 (on right), the selector assembly is initially in the position shown in Fig. 4 reproduced below. The second gear 27 is fully engaged, that is the connector elements 59 attached to the second gear 27 are located between the connector elements 61 of the selector element 36 and a stop members 43 of a selector element 37 as shown in Fig. 5, which is also reproduced below.

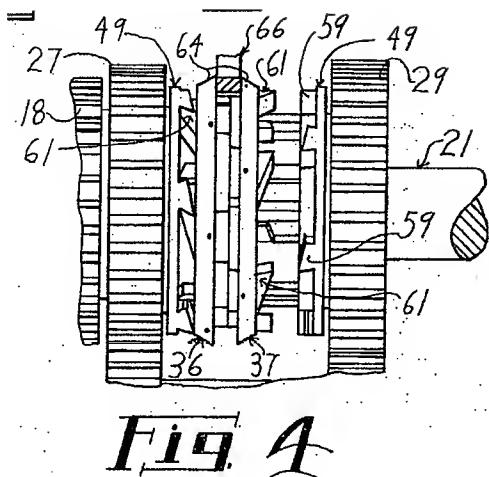


Fig. 4

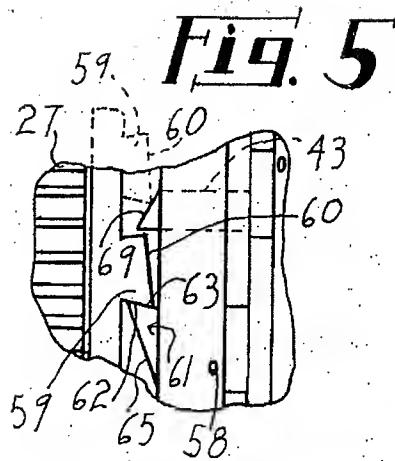
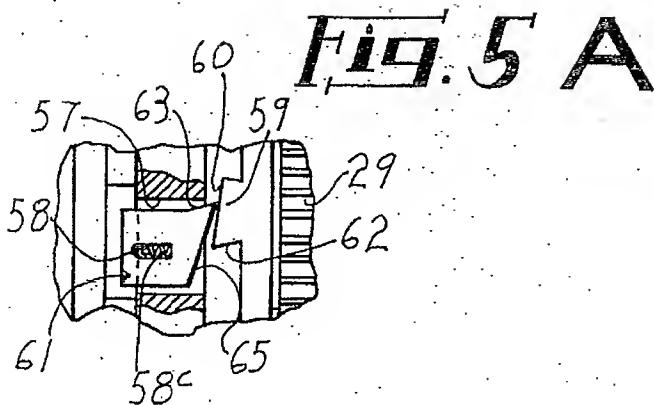


Fig. 5

When operating in a forward torque direction (this is the condition when performing an upshift), there is a substantial operating pressure between the connector element 61 and 59, thus the connector elements 61 are said to be "loaded" in the claim language of the current application. Accordingly, there is a relatively smaller loading on the stop members 43 and they are said to be "unloaded". In the reverse torque direction (this is the condition when performing a downshift) the driving pressure is primarily between the connector element 59 and the stop members 43, and therefore the stop members are said to be loaded in this condition.

It is taught in Thomas '737 in column 6, lines 33-57 and shown Fig. 5A below, that when performing a downshift it is the selector element 37 that is moved into engagement with the first gear wheel 29 initially, thus withdrawing the stop members 43 out of engagement with the connector elements 59 associated with the second gear 27. Thus, the transmission system of Thomas '737 moves the "loaded" stop members 43 out of engagement with the second gear 27 when performing a downshift. This contrasts with the claimed invention, wherein the "unloaded" set of engagement members is moved to effect a gear change.



This difference is highly significant since the consequence of moving the loaded set of engagement members when performing downshifts in Thomas '737 requires a highly complicated selector assembly design. Thomas has provided connector elements 61 that are depressible as shown in Figure 5A. This is required because when the selector element 37 engages the new gear (first gear 29 in this instance) the connector elements 61 are rotating at a greater speed than the lower gear (first gear 29) and its connector elements 59, and therefore the engagement faces 62 of connector elements 61 are moving away from the connector elements 59. Therefore it is the cam surfaces 65 that are moving towards the connector elements 59 and make the initial engagement. This causes the connector elements 61 to be depressed into the selector element 37 as they pass over the connector elements 59 (see column 6, lines 41-46, and column 9, line 59 to column 10, line 11). The springs 47 subsequently urge the selector element 36 towards the first gear 29 and the stop members 43 engage the connector elements 59 and prevent further relative rotational movement between the selector elements 37 and the first gear 29.

Patentability of Claim 1

However, in the method of downshifting as disclosed in current application, it is apparent from paragraph [0062], that moving the unloaded set of engagement members in the claimed invention when performing a downshift leads to a situation wherein the drive faces 43 engage the dogs 21 directly. That is, the engagement faces 43 are oriented towards the dogs 21 and thus properly engage the dogs 21. Paragraphs [0059] to [0062] state that it is the first bar set 27 (the unloaded bars) that is moved into engagement with first gear 3 when performing a downshift. Further, it is indicated that when the first gear wheel 3 is engaged, the first bar set 27 "drives" the first gear, that is, the first bar set 27 engages the dogs on the first gear 3 with its drive faces 43.

When decelerating in the second gear wheel pair 17, the engagement faces 43 of the first bar set 27 are not loaded while the engagement faces of the first bar set 29 are loaded.

Thus, for the claimed invention it is not necessary to have the complicated structure of Thomas '737, wherein the connector elements 61 in Thomas '737 are depressible. This is a direct result of moving the unloaded set of engagement members when performing downshifts.

It is clear from the arrangement that the shift fork 66 in Thomas '737 is arranged to push each selector element 36, 37 in one direction only, the consequence of this being that regardless of whether performing an upshift or a downshift the new gear is always engaged initially with connector elements 61. It is not possible to initially engage the connector elements 59 with the stop members 43, as disclosed in current application, since these are always pulled into engagement by springs 47. This detail is a critical limitation for the transmission system disclosed in Thomas '737 since it leads to a more complicated design and arguably less robust than the claimed invention.

Furthermore, it is submitted that selection of the backlash tolerance range of "less than or equal to four degrees" as claimed in Claim 1 is not just a regular design choice by the skilled person, but rather is an important characteristic of the way in which the transmission system of the current application differs from Thomas '737. That is, this tolerance range ensures that there is always one set of engagement members that is in an unloaded condition, while at the same time reducing the effects of large engagement concussions that occur when there is significant backlash. Through its inventive efforts, Applicant has determined the optimum parameters for the method for downshifting as disclosed in the application.

Thomas '737 Does Not Anticipate Claims 1-5, 7-19, 21-23, and 26

In order for a claim to be anticipated by a reference, each claim element must be disclosed by the reference. Applicant notes that claim 6 was not included in this rejection. Claim 1 as amended recites the feature of canceled claim 6, namely that the backlash when moving between acceleration and deceleration is less than or equal to four degrees. This feature is not disclosed or suggested by Thomas '737. Thus, Thomas '737 does not anticipate Claim 1. Furthermore, since Claims 2-5, 7-23 and 26 depend directly or indirectly from Claim 1, Thomas '737 does not anticipate these claims.

In view of the comments presented above, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b).

Rejections under 35 U.S.C. §103(a)

Claims 6 and 24 were rejected under 35 U.S.C. §103(a) as being unpatentable over US 3,780,840 (Thomas '840.) Claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over Thomas '840 in view of US 4,098,380 to Thomas (Thomas '380.) Finally, Claim 20 was rejected under 35 U.S.C. §103(a) as being unpatentable over Thomas '840 in view of Thomas '380, and further in view of US 4,241,818 to Miller (Miller.)

Standard for Obviousness Rejection

The Patent and Trademark Office has the burden under section 103 to establish a *prima facie* case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-87 (Fed. Cir. 1984). To establish a *prima facie* case of obviousness, however, prior art (as opposed to prior art references) must teach or suggest all the claim limitations. "Examination Guidelines for Determining Obviousness Under 35 U.S.C. §103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*" Federal Register Vol. 72 No. 195 at 57528 (October 10, 2007). Further, the Patent Office must explain why the differences between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. *Id.*

Discussion of Rejection of Claims 6 and 24 Under 35 U.S.C. § 103

Claim 6 has been canceled and its limitations incorporated into Claim 1. Claim 24 as amended is also ultimately dependent upon Claim 1. The patentable features of Claim 1 are discussed above, and are equally applicable when comparing the claimed features to the Thomas '840 and '380 patents.

In addition, Claim 24 is patentable in view of the additional limitations set forth therein, namely that the first and second sets of engagement members comprise three members. The Office Action stated on page 9 and 10 that it would have been obvious to one of ordinary skill in the art at the time the invention was made to for the engagement members to have three members. However, the number of engagement members is an important characteristic of the way in which the transmission system of the Applicant's invention works.

With reference to Figs. 2 and 3 of the Applicant's application, which are reproduced below, the specification in paragraph [0040] states that "Referring specifically to Figure 2 (showing selector assembly 13), the first set of engagement bars 27 comprises three bars 28 (three engagement members)..." In regard to the selector assembly 13 of Fig. 2, the Applicant further states in paragraph [0045] that "When the bars (28) of the first and second sets 27, 29

(sets of engagement members) are interleaved, as in Figure 2, the dog engagement faces 43 of the first end 28a of the first set of bars 27 are adjacent the dog engagement faces 43 of the first end 30a of the second set of bars 29. When the first and second sets of bars 27, 29 are fully engaged with a gear a dog is located between each pair of adjacent engagement faces 43." Further in paragraph [0037] the Applicant discloses that "The first dog group 19 comprises three dogs evenly circumferentially distributed about the gear face, i.e. the angle subtended between the centres of a pair of dogs is approximately 120° (see Figure 3). The second dog group 21, comprises three dogs and is similarly arranged on one side of the second gear wheel. Three dogs are used because this arrangement provides large engagement windows, that is the spaces between the dogs, to receive the selector assembly 13. Large engagement windows provide greater opportunities for the selector assembly to fully engage the gear wheels 3, 5 before transmitting drive thereto. If the selector assembly 13 drives a gear wheel when only partially engaged it can lead to damage of the dogs and / or the selector assembly 13."

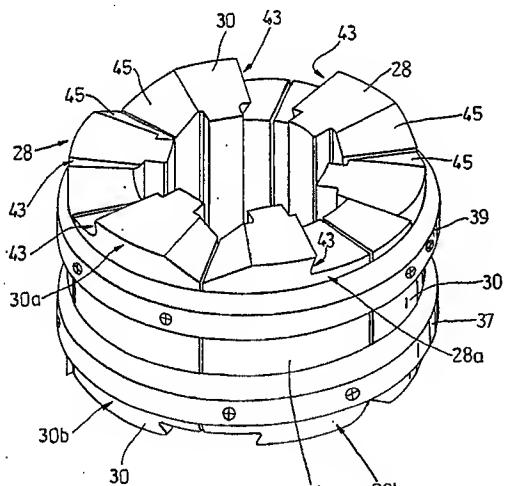


Fig. 2

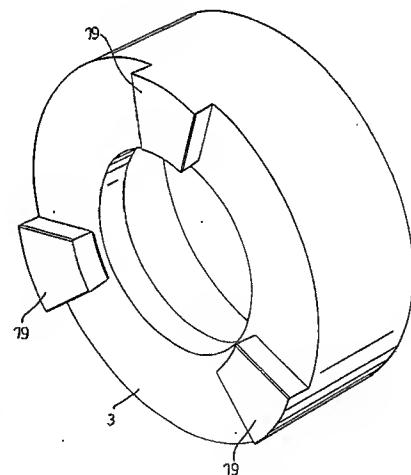


Fig. 3

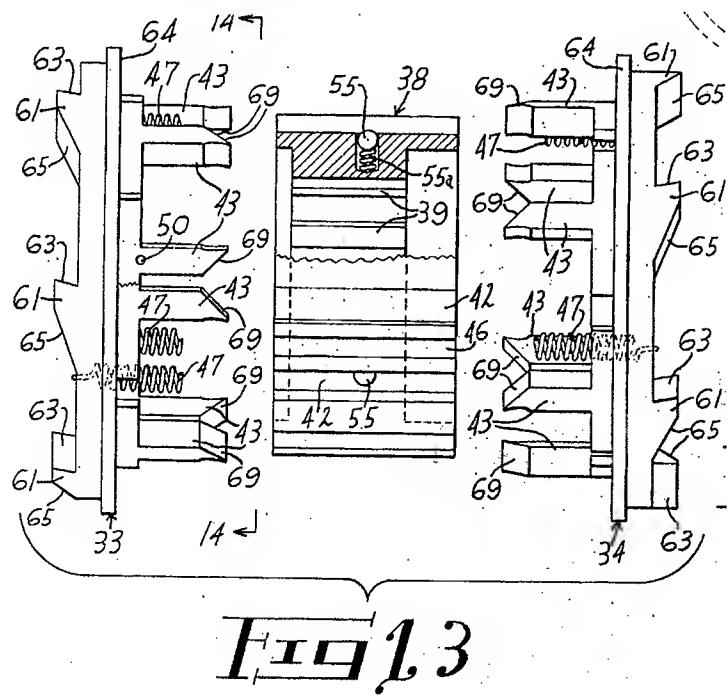
Since it is advantageous to have dog group 19 comprising three dogs to provide large engagement windows, it is an important feature for the selector assembly 13 to have three dog engagement faces 43 complementary to the dog group 19. Thus, combination of three engagement members (28 and 30) for each of the set of the engagement members 27 and 29 to form the selector assembly 13 of Fig. 2 is crucial to the Applicant's invention.

Therefore, in view of the failure of the cited reference, Thomas '840, to describe the claimed features and the advantages associated with these features, Claim 24 is non-obvious over the reference. With no additional evidence of teaching these features in the prior art, no *prima facie* obviousness has been established with regard to Claim 24.

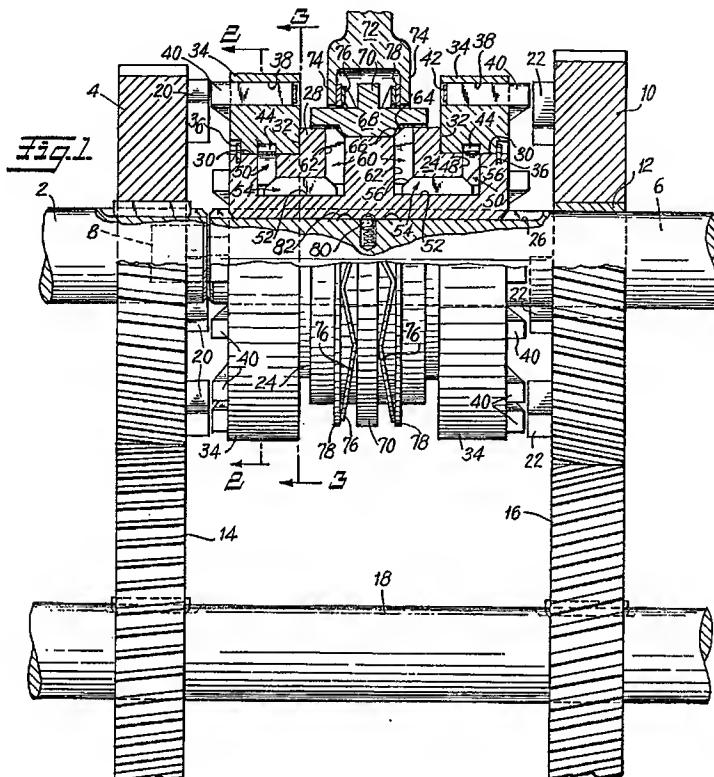
Discussion of Rejection of Claim 25 Under 35 U.S.C. § 103

Claim 25 as amended recites a method as claimed in Claim 19 and further to Claims 14 and 1, wherein the resiliently deformable means is a disc spring. The Office Action asserted on page 10 that Thomas '840 teaches a transmission system having resiliently deformable means which are springs, but fails to teach the springs being disc springs. Consequently, Thomas '380 was referenced to remedy this failure of Thomas '840 as Thomas '380 allegedly teaches a transmission system having resiliently deformable means as disc springs.

Thomas '840 teaches springs 47 (as shown in Fig. 13 of Thomas '830) within a transmission system. As it is stated in Thomas '830 Col. 4 Lines 1-14, ends of the springs 47 are connected to the adjacent gear selector elements whereby adjacent gear selector elements are urged toward each other and away from their associate gear. That is, the spring 47 urge the gear selector elements 33 and 34 towards each other whereby the gear selector element 33 is urged away from gear 11 (not shown, but to the left of the figure) while gear selector element 34 is urged away from gear 18 (not shown, but to the right of the figure).



Thomas '380 teaches disc springs 76 (as shown below in Fig. 1 of Thomas '380) that normally hold the shift fork 72 in centralized relation to the rib 70. When the springs 76 are compressed they are configured to apply resilient pressure to a side of rib 70.



However, the disc springs of the current are configured to move or bias the first and second engagement members in the selector assembly. The inner edges of the first disc springs 47 as shown below in Fig. 1 of current application, are fixed to the bars 28 (engagement members) in the first bar set 27 and the inner edges of the second disc spring 49 are fixed to the bar 30 in the second bar set. When the fork 46 moves, thereby moving or loading the disc springs 47, 49 the engagement bar sets 27, 29 are likewise moved or biased to move. The fork 46 has a first pair of arcuate members arranged to engage the first disc spring 47. The first arcuate members are arranged such that the first disc spring 47 can rotate with the input shaft 1 between the first arcuate members and such that axial movement of the fork 46 parallel to the input shaft 1 moves the first arcuate members and hence the first disc spring 47 axially along the shaft if the first disc spring 47 is free to move, or biases the first disc spring 47 to move in the same direction as the fork 46 if the first disc spring 47 is unable to move. The fork 46 has a

second pair of arcuate members 53 arranged to engage and act upon the second disc spring 49 in a similar manner.

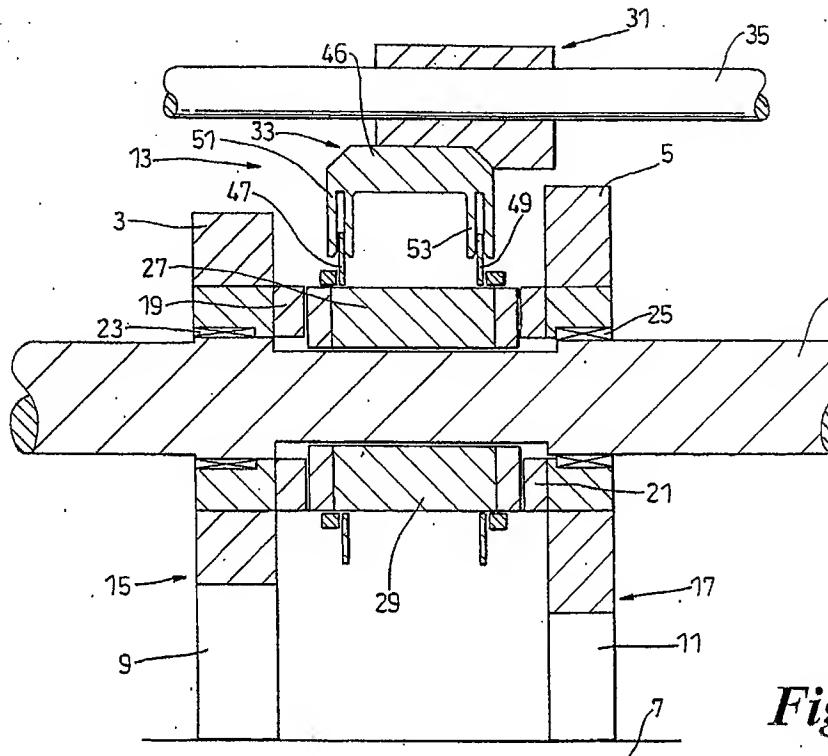


Fig. 1

In comparison, Thomas '840 merely teaches springs that are configured to compress gear selector elements or provide compressible components within the transmission system. And Thomas '380 merely teaches disc springs that provide resilient force to keep the fork in a central position. Therefore, the springs taught in the two references as described above, either alone or in combination, do not teach or suggest disc springs of the current application, wherein the disc springs of the current application provide a substantially more complicated and useful function of providing movement or biased movement of the engagement members of the selector assembly of the transmission.

Thus, Claim 25 cannot be obvious over these references. In view of the amendments and comments presented above, Applicant respectfully requests reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a).

Discussion of Rejection of Claim 20 Under 35 U.S.C. § 103

Claim 20 as amended recites a method as claimed in Claim 25 further to Claims 19, 14, and 1, wherein the disc spring comprises a plurality of arms, each arm having a first part that extends circumferentially around a portion of the disc spring and a second part that extends substantially radially inwards. The Office Action asserted on pages 10-11 that combination of Thomas '840 and Thomas '380 teaches a disc spring within a transmission system, but fails to teach the disc springs comprising a plurality of arms. Consequently, Miller was referenced to remedy this failure of combination of Thomas '840 and Thomas '380 as Miller allegedly a disc spring having a plurality of arms.

Miller teaches a spider spring 42 configured with three arms 44 emanating from a central portion 46, as shown below in Fig. 3 of Miller.

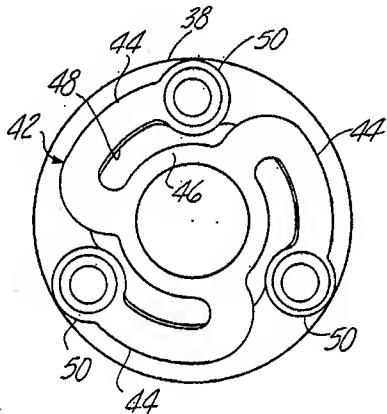


Fig - 3

However, as it can be seen in Fig. 4 (below) of current application, the current application claims disc springs, wherein the disc spring comprises a plurality of arms, each arm having a first part that extends circumferentially around a portion of the disc spring and a second part that extends substantially radially inwards, "without a central portion," such as central portion 46 of Miller.

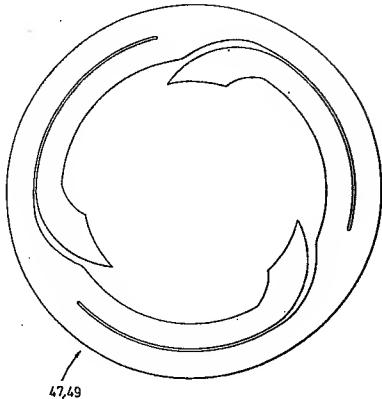


Fig. 4

By incorporating the same rationale as described in the above section regarding Thomas '840 and Thomas '380, the three references (Thomas '840, Thomas '380 and Miller) either alone or in combination, do not teach or suggest disc springs having a plurality of arms with a certain configuration as disclosed in the current application.

Thus, Claim 20 cannot be obvious over these references. In view of the amendments and comments presented above, Applicant respectfully requests reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a).

New Claim 34

New Claim 34 introduces the limitation that the first and second sets of engagement members are substantially identical but opposite handed. As described in Paragraph [0043] of the specification, this feature provides additional advantages. Accordingly, Claim 34 is patentable in view its dependency on claim 1, and in view of these additional advantages as well.

Other Dependent Claims

Although Applicants have not addressed all the issues of the dependent claims, Applicants respectfully submit that Applicants do not necessarily agree with the characterization and assessments of the dependent claims made by the Examiner, and Applicants believe that each claim is patentable on its own merits. Applicants respectfully submit that pursuant to 35 U.S.C. § 112, ¶4, the dependent claims incorporate by reference all the limitations of the claim to which they refer and include their own patentable features, and are therefore in condition for allowance. Therefore, Applicants respectfully request the withdrawal of all claim rejections and prompts allowance of the claims.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicants are not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

Conclusion

Applicant submits that all claims are in condition for allowance. However, if minor matters remain, the Examiner is invited to contact the undersigned at the telephone number provided below. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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